Name: Date:

Polynomial Factoring solution (version 700)

1. **The quadratic formula says if $ax^2 + bx + c = 0$ then $x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$. Use the quadratic formula to solve the following equation.**

$$x^2 - 10x + 52 = 0$$

Simplify your answer(s) as much as possible.

Solution

$$x = \frac{-(-10) \pm \sqrt{(-10)^2 - 4(1)(52)}}{2(1)}$$

$$x = \frac{-(-10) \pm \sqrt{100 - 208}}{2(1)}$$

$$x = \frac{10 \pm \sqrt{-108}}{2}$$

$$x = \frac{10 \pm \sqrt{-36 \cdot 3}}{2}$$

$$x = \frac{10 \pm 6\sqrt{3}\, i}{2}$$

$$x = 5 \pm 3\sqrt{3}\, i$$

Notice that i in NOT under the square-root radical symbol!!

2. **Express the product of $3 + 8i$ and $-2 + 6i$ in standard form $(a + bi)$.**

Solution

$$(3 + 8i) \cdot (-2 + 6i)$$

$$-6 + 18i - 16i + 48i^2$$

$$-6 + 18i - 16i - 48$$

$$-6 - 48 + 18i - 16i$$

$$-54 + 2i$$

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3. **Write function $f(x) = x^3 - 7x^2 + 7x + 15$ in factored form. I'll give you a hint: one factor is $(x - 5)$.**

Solution

$$\begin{array}{c|cccc} & 1 & -7 & 7 & 15 \\ 5 & & 5 & -10 & -15 \\ \hline & 1 & -2 & -3 & 0 \end{array}$$

$$f(x) = (x-5)(x^2 - 2x - 3)$$

$$f(x) = (x-5)(x+1)(x-3)$$

4. **Polynomial p is defined below in factored form.**

$$p(x) = (x+4) \cdot (x+1) \cdot (x-3)^2 \cdot (x-6)$$

Sketch a graph of polynomial $y = p(x)$.